An integrated unit focusing on the management decisions regarding one of Arizona's major predators

Mountain Lions in Arizona

Lesson 4: Humans and Lions – Conflicts Through Time

LESSON OVERVIEW

Students will learn about the history of predator management policies that led to the sharp decline in mountain lion populations throughout the United States. They will read a short article about mountain lion management and answer questions.

SUGGESTED GRADE LEVELS

- 6 – 12

ENDURING UNDERSTANDINGS

- Modern wildlife management is based on science as well as on the social pressures of the time.

OBJECTIVE

Students will:

- Read and comprehend a scientific article.
- Create a bar graph from a given set of data.
- Develop conclusions supported by scientific data.

ARIZONA DEPARTMENT OF EDUCATION STANDARDS

Grade	Science	Social Studies
6	S1-C3-03; S1-C3-04; S1-C4-03	S1-C1-02
7	S1-C3-05; S1-C4-03	
8	S1-C3-05; S1-C4-03	
High School	S1-C3-06; S1-C4-02; S1-C4-04; S3-C1-05; S3-C2-03; S3-C2-05	S1-C1-01; S3-C3-05

Note: The full text of these standards can be found in Appendix A.

TIME FRAME

- 1 day (45 minutes)

MATERIALS

- *History of Mountain Lion Management* article (1 per student)

TEACHER PREPARATION

- Make copies of the *History of Mountain Lion Management* article for each student

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SUGGESTED PROCEDURES

1. Ask students: "Do you believe it is legal to hunt mountain lions in the United States?" They can answer in the form of a journal entry or a class discussion. Select key answers for further discussion. Inform students that in many states hunting mountain lions is part of mountain lion management, and we are going to explore this further by reading an article on the history of mountain lion management.
2. Hand out the *History of Mountain Lion Management* article. Explain to students that they are to read the article silently and, when finished, answer the questions on a separate sheet of paper. If they do not finish in class, they can complete the assignment as homework.
3. When students have answered the questions, ask volunteers to read their paragraphs. Discuss their responses with the class. Point out that the many viewpoints that people have on this topic show that although science suggests an answer, decision-makers must take into account the values and concerns of stakeholders and constituents as well as science when making decisions. Decisions that will affect the public must respect the variety of backgrounds, experiences, and values that the public brings to the decision-making process. As a result, many questions may have more than one appropriate answer.
4. Collect the answers. If you will be reusing the article, collect it as well.

ASSESSMENT

- Responses to *History of Mountain Lion Management* questions
- Class discussion

EXTENSIONS

- Students can read and summarize the article "Predator Management: An Issue with Teeth" in the May-June 2001 issue of *Arizona Wildlife Views* magazine, published by the Arizona Game and Fish Department.
- Encourage your students to participate in the *Hot Topics Campfire Chat* with their parents at home.

ARIZONA GAME AND FISH DEPARTMENT POSITION

The Arizona Game and Fish Department has determined that mountain lions will be destroyed if they attack a human or when they are judged to be a substantial threat to public safety. However, dogs, cats, and other small domestic pets could be considered a natural prey base for lions. The loss of these pets from lions will not be a sufficient reason to remove a lion from its home range. The agency has considered trapping and relocating problem lions; however, due to their large home ranges, the fact that all suitable habitat is occupied, and intraspecific defense of occupied habitat, this option will not be used.

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Appendix A: Arizona Department of Education Standards – Full Text

Science Standards

Grade	Strand	Concept	Performance Objective
6	1	3 – Analysis and Conclusions	3 – Evaluate the observations and data reported by others 4 – Interpret simple tables and graphs produced by others
		4 – Communication	3 – Communicate the results of an investigation with appropriate use of qualitative and quantitative information
7	1	3 – Analysis and Conclusions	5 – Formulate a conclusion based on data analysis
		4 – Communication	3 – Communicate the results of an investigation with appropriate use of qualitative and quantitative information
8	1	3 – Analysis and Conclusions	5 – Explain how evidence supports the validity and reliability of a conclusion
		4 – Communication	3 – Present analyses and conclusions in clear, concise formats
High School	1	3 – Analysis, Conclusions, and Refinement	6 – Use descriptive statistics, like mean, to analyze data
		4 – Communication	2 – Produce graphs that communicate data 4 – Support conclusions with logical scientific arguments
	3	1 – Changes in Environments	5 – Evaluate the effectiveness of conservation practices and preservation techniques on environmental quality and biodiversity
		2 – Science and Technology in Society	3 – Support a position on a science or technology issue 5 – Evaluate methods used to manage natural resources

Social Studies Standards

Grade	Strand	Concept	Performance Objective
6, 7, 8	1	1 – Research Skills for History	2 – Interpret historical data displayed in graphs, tables, and charts
High School	1	1 – Research Skills for History	1 – Interpret historical data displayed in graphs, tables, charts, and geologic time scales
	3	3 – Functions of Government	5 – Describe the factors and processes that determine major domestic policies (e.g., social security, education, health care, parks, environmental protection)

Appendix B: Worksheets and Overheads

The pages that follow contain the worksheets listed below:

A. *History of Mountain Lion Management* – An article describing how the government has managed mountain lions through recent history. Poses questions regarding mountain lion management. (2 pages)

History of Mountain Lion Management

The United States has a long history of managing mountain lions and other large predators. According to a 2001 report by the United States General Accounting Office:

> The practice of managing wildlife is not new, nor is the control of predators. For centuries, control of mammalian predators has been practiced worldwide as a means of protecting livestock and enhancing game populations. The first recorded federal involvement in wildlife damage control in the United States occurred in 1885, when a federal agency sent questionnaires to farmers about crop damage caused by birds. By 1915, the Congress was appropriating funds for federal predator control operations directed at wolves and coyotes. In 1931, the Congress passed the Act of March 2, 1931 [Animal Damage Control Act (7 U.S.C. 426-426c)], authorizing the control of injurious animals. Since then, federal wildlife control activities have evolved along with demographic and societal changes. In the program's early years, for example, the emphasis was on conducting general eradication campaigns that might be directed at the entire statewide population of a particular species of predator.[1]

There are many reasons to support predator control measures, one of which is financial, primarily concerning the loss of livestock due to depredation. Estimates indicate that each year the United States loses $71 million due to livestock loss (Table 1).

Table 1: Annual Livestock Losses Attributed to Predators[2, 3]

Livestock	Number Lost to Predators	Value of Loss (in millions)
Cattle	147,000	$51.6
Sheep	273,000	$16.5
Goats*	61,000	$3.4
Total	481,000	$71.5

** Losses of goats and kids were reported only for three states: Arizona, New Mexico, and Texas*

Human safety is always a concern. As the human population of the country increases, wildlife habitat shrinks and people are more likely to encounter wildlife. Some of these encounters are going to be negative. In fact, thousands of people are injured or killed each year from animal attacks (Table 2).

Table 2: Estimates of Annual Human Injuries and Fatalities in the United States from Wildlife Bites or Attacks[4, 5, 6]

Animal	Number of Injuries	Number of Fatalities
Bees and Wasps	More than 1,000,000	30-120
Dogs	800,000	17
Rodents	27,000	Unknown
Venomous Snakes	8,000	15
Skunks	750	0
Foxes	500	0
Bears	30	1
Sharks	28	2
Alligators	18	.5
Coyotes	2	0
Mountain Lions	2	.4

Note: These data are extrapolated from various studies done in various geographic regions over various periods of time. They are probably understated because they exclude nonreported bites, which could be quite high in number.

The government invested many resources in an attempt to eliminate these predators. "Between 1937 and 1970, federal employees…killed 7,255 cougars; 23,830 bears; 477,104 bobcats; 50,283 red wolves; 1,744 lobo wolves; 2,823,000 coyotes; and millions of other animals."[7] In addition to these efforts, many states offered bounties on animals they deemed to be "undesirable predators," particularly the mountain lion. Between 1907 and 1978, nearly 50,000 mountain lions were killed in the United States (Table 3).

Table 3: Approximate Number of Mountain Lions Killed in United States, 1907 – 1978[8]

State	Time Period	Minimum Killed
Arizona	1917 – 1973	8,557
California	1907 – 1973	12,705
Colorado	1917 – 1974	2,007
Idaho	1928 – 1973	2,781
Montana	1921 – 1974	503
Nevada	1917 – 1973	2,198
New Mexico	1917 – 1973	1,283
Oregon	1918 – 1973	6,831
Texas	1925 – 1973	776
Utah	1913 – 1978	6,253
Washington	1936 – 1973	5,253

Today, mountain lion management is based upon sound scientific principles. The Arizona Game and Fish Department states that "(m)ountain lions…will be managed to ensure their future ecological, intrinsic, scientific, educational, and recreational values, to minimize conflicts with humans, and to minimize adverse impacts on other wildlife populations."[9]

Hunting mountain lions is legal in eleven western states. Of the twelve states listed above, only California lists mountain lions as protected. In Arizona, approximately 200 – 300 mountain lions are legally harvested every year by hunters, and about fifty more are removed as outlined by Arizona state law.[10] A small population of mountain lions still exists in Florida, where the species is listed as endangered and receives protection according to the Endangered Species Act.

Sources:

[1] "Report to Congressional Committees: Wildlife Services Program." United States General Accounting Office. Nov. 2001.

[2] "Cattle Predator Loss." National Agricultural Statistics Services. May 2001 (data for 2000).

[3] "Sheep and Goats Predator Loss." National Agricultural Statistics Services. May 2000 (data for 1999).

[4] Michael R. Conover, William C. Pitt, K. K. Kessler, T. J. DuBow, and W. A. Sanborn. "Review of human injuries, illnesses, and economic losses caused by wildlife in the United States." Wildlife Society Bulletin. Vol. 23, No. 3. pp. 407-414. Fall 1995.

[5] "Bee and Hymenoptera Stings." eMedicine. http://emedicine.com/emerg/byname/bee-and-hymenoptera-stings.htm

[6] "Dog Bite Statistics." Northeast Arkansans for Animals. http://www.nafacares.org/Dog%20Stuff/dog_bite_statistics.htm

[7] Hansen, Kevin. *Cougar: The American Lion*. Flagstaff: Northland Publishing, 1993.

[8] Nowak, R. M. *The Cougar in the United States and Canada*. Washington, D.C.: New York Zoological Society and U.S. Fish and Wildlife Service Office of Endangered Species, 1976.

[9] "Predation Management Policy." Arizona Game and Fish Department. Department Operating Manual. A2.31. Sept. 14, 2001.

[10] "Mountain Lion." Arizona Game and Fish Department. http://www.azgfd.gov/h_f/game_lion.shtml

Comprehension Questions

1. What is meant by the term "predator control"?
2. What are two reasons wildlife management agencies may decide to control predators?
3. Rewrite the following sentence in your own words: In the program's early years, the emphasis was on conducting general eradication campaigns that might be directed at the entire statewide population of a particular species of predator.
4. On average, how many people do mountain lions kill in the United States every year?
5. Use the data from Table 3 to calculate the average number of mountain lions killed every year in each state. Make a bar graph that clearly shows this information.
6. Based on the information presented in this article, write a paragraph explaining your position on whether the United States government was justified in nearly eliminating the mountain lion. Be sure to explain your reasoning, supported by scientific data provided in this article or in another scientific report you have reviewed. Be sure to identify your source(s) of information.